



EE49: Building Networked Systems using the NI USRP

Course Overview

Building Networked Systems was developed at Stanford University and first taught to a trial group of students in the Spring 2011 quarter with the EE 49 designation. With the software/hardware combination of LabVIEW and the [NI USRP](#), students were able to build and explore each element of a complete communications system signal chain. The course progression covered topics including channel coding, modulation, demodulation, timing recovery and culminated with students building their own protocol.

Course evaluations affirmed that students were highly engaged in and benefited greatly from the EE 49 class. “The course evaluations for our class were fantastic,” said Katti. “Students rated the class 4.94/5.0, likely making it one of the highest rated among all classes in the School of Engineering at Stanford.” To learn more about the course view the case study entitled: [Designing Hands-On Wireless Communications Labs With the NI Universal Software Radio Peripheral and LabVIEW](#).

These materials are considered a work-in-progress and reflect the first run of the course. The course is anticipated to run again in the Spring of 2012.

Laboratory Procedures

EE49 Lab 1: Source Coding Lab: Cosine Transform (DCT), sample quantization, and Huffman coding

EE49 Lab 2: Introduction to Digital Communication Lab: UART Communication, Sync, and Channel Correction

EE49 Lab 3: Introduction to Modulation: BPSK & QPSK

EE49 Lab 4: Introduction to Demodulation and Decoding: BPSK & QPSK

EE49 Lab 5: Building a Wireless Packet Transmitter and Receiver

Course Instructors

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 - Heads the Stanford Networked Systems Groups
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